

Savannah River Laboratory Seepage Basins

Background

The Savannah River Laboratory (SRL) Seepage Basins are located in the southern part of A Area at the Savannah River Site (SRS). The four rectangular basins received low-level radioactive waste liquids from two SRL research facilities (SRL is now known as the Savannah River Technology Center). The first two basins were placed into operation in 1954 and the second two basins were added between 1958 and 1960. Discharges to the basins ceased in late 1982.

A 950-foot underground process sewer line transported waste from four SRL waste tanks to the basins. Whenever a tank collected approximately 20 cubic meters of waste, technicians would sample it for radioactivity. If the waste exceeded federal regulatory standards, laboratory operators sent it by tank truck to the F Area Separations facility for disposal. If radiation levels in the waste fell below these conservative guidelines, the waste was released to the basins. Waste entered Basin 1 first, and if levels exceeded capacity, water would overflow into Basins 2, 3, and 4 consecutively.

Environmental Concerns

Waste liquids would occasionally seep through the basin bottoms, transferring radionuclides to the surrounding soil. In 1983, characterization of the area showed that the radionuclides had not moved deeper than two feet below the basins. Although tritium was the predominant radionuclide collected during the basins' 28-year operation, the final list of contaminants of concern to be remediated include actinium-228, americium-241, cesium-137, cobalt-60, curium-243/244, lead-212, neptunium-239, plutonium-238, plutonium-239/240, potassium-40, radium-228, strontium-90, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235, uranium-238, and chromium. In addition, monitoring data indicate the presence of mercury and silver. Contamination decreases substantially from Basin 1 to Basin 4.

Environmental Actions and Plans

In 1990, SRS environmental professionals began investigations by sampling soils and groundwater and surveying the process sewer line for possible breaks. In 1996, a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) characterization of the basins, surrounding area, groundwater, and a nearby stream were initiated. Sampling results showed that the soils in the basins were radioactively contaminated. It also was determined that the basins did not contribute to contamination of the groundwater.

In 1996, vegetation was analyzed for uptake of radionuclides and metals through their roots. In 1997, a removal action that involved the cutting, chipping, packaging, transportation, and disposal of the radioactively contaminated vegetation began. This activity was completed in 1999 with the disposal of the vegetation in the SRS engineered trenches.

A Remedial Investigation, Baseline Risk Assessment, and Feasibility Report were developed with input from the U. S. Environmental Protection Agency (USEPA), South Carolina Department of Health and Environmental Control (SCDHEC), and the public. A Statement of Basis/Proposed Plan was issued in 1998 and approved by the regulatory agencies in 1999. The Record of Decision was signed in 1999.

Final remediation of the SRL Seepage Basins began in February 2000 and was completed in May 2001. The action involved the removal of all principal threat source material (radioactively-contaminated soils), offsite disposal of the removed material, and backfill of the basins. The excavation of the radioactively-contaminated soil and a section of the process sewer line was removed and packaged in lift liners that were used in the removal of the vegetation. The lift liners were transported by rail and disposed of at Envirocare of Utah, Inc., an approved and licensed low-level waste disposal facility. The four basins were backfilled to grade with clean soil, and the soil surface was planted with vegetation to prevent erosion. In February 2002, following completion of this effort, a Corrective Measures Implementation Report/Post Construction Report/Final Remediation Report was submitted and approved by the USEPA and SCDHEC.